IJBPAS, April, 2012, 1(3): 331-336

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

PHYTAL NEMATODES ASSOCIATED WITH *Caulerpa fastigiata* AND *Caulerpa taxifolia* OF VISAKHAPATNAM COAST

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ABSTRACT

The present investigation describes the qualitative and quantitative distribution of phytal nematodes on two intertidal algae, *Caulerpa fastigiata* and *Caulerpa taxifoila*, along Visakhapatnam coast from August 2009 to July 2010. Altogether 34 samples were analysed and forty one nematode species were identified from *Caulerpa fastigiata* and thirty four from *Caulerpa taxifoila*. The epistratum feeders were more dominant in both the algae followed by predators/omnivores, non-selective deposit feeders and selective deposit feeders. The major trophic groups are epigrowth feeders, suggesting the existence of a benthic food web based on detritus and benthic primary producers.

Keywords: Phytal, Nematodes, *Caulerpa fastigiata, Caulerpa taxifolia*

INTRODUCTION

Nematodes constitute a numerous and widely distributed group in world fauna. They inhabit seas, fresh waters, and soil. Many are parasites. Since representatives of the class Nematoda are numerous, their role in the national economy and the life of man is significant. Nematodes are typical inhabitants of the benthos; their entire development and subsequent life cycle take place in benthic surroundings. Some nematodes, however, lead a pleustonic mode of life. Often nematodes are found in different types of overgrowths. Many species of algae are infested by nematodes; they are also found in hydroids, sponges, bryozoans, and other invertebrates. Although some species are only found in very specific biotopes, others are more widely distributed **[1]**. The free-living meiofaunistic nematodes have a vertical and horizontal distribution on a global scale and are frequently, dominant in sediments from

coastal areas to great ocean depths, at all latitudes. They colonize all types of substrates such as sediments, macrophytes and even artificial substrates **[2, 3, 4, 5, 6, 7, 8]**. The nematodes play a significant role in detritus formation, nutrient recycling and in energy flow through the benthic communities. The benthic invertebrates are linked with fishes through food web. Due to dearth of information available on nematodes associated with algae from the Indian sub continent, the present work was undertaken.

MATERIALS AND METHODS

The study was carried out on the Visakhapatnam coast. Eleven samples of *Caulerpa fastigiata* were collected on a rocky beach of Palm Beach in the mid littoral zone from August 2009 to July 2010, except in the month of June 2010 due to Laila cyclone. Six samples of *Caulerpa taxifolia* were collected at coastal battery in rock pools in the mid littoral zone. *Caulerpa taxifolia* was collected during August – November 2009, January 2010 and July 2010 months only due to unavailability of this species in the other months in the study area.

At the laboratory, the faunistic samples were treated using routine methods for meiofauna (humid sieving and manual centrifugation) as suggested by **[9]**. The animals were removed manually using a needle and permanent slides were made for taxonomic and biological studies of Nematoda, as described by **[10]** and **[11]**. They were sorted into functional groups according to **[12]**:

1A: selective deposit feeders: nematodes with a very small unarmed buccal cavity;

1B: non-selective deposit feeders: nematodes with unarmed buccal cavities of moderate size;

2A: epistratum feeders: nematodes with medium size buccal cavities, provided with small teeth;

2B: predators or omnivores: nematodes with wide buccal cavities, large teeth or other powerful buccal structures.

RESULTS

The nematodes in *Caulerpa fastigiata* constituted 57 species belonging to 41 genera and 19 families were encountered. *Dorylaimopsis punctata* (21.16%) was the most abundant followed by, *Halichoanolaimus dolichurus* (11.97%), *Metalinhomoeus longiseta* (8.03%), *Viscosia cobbi* (5.69%), *Desmolaimus zeelandicus* (3.32%) accounting for 50% of the total nematode population. The nematodes in *Caulerpa taxifolia* constituted 48 species belonging to 34 genera and 16 families were encountered. The most abundant nematode species encountered during this study were *Halichoanolaimus dolichurus* (13.78%), *Metalinhomoeus longiseta* (6.69%), *Daptonema vicinum* (5.17%), *Daptonema invagiferoum* (3.96%),

Viscosia cobbi (3.89%), *Dorylaimopsis punctata* (3.54%), *Paracanthonchus caecus* (3.30%), *Theristus acer* (3.17%), *Paracanthonchus longicaudatus* (3.10%), *Halalaimus longicaudatus* (2.90%), *Pomponema tesselatum* (2.78%), *Spilophorella candida* (2.54%) accounting for 50%of the total population.

Table 1: Nematodes Sorted into Functional Groups

Feeding types	*Caulerpa fastigiata*	*Caulerpa taxifolia*
1A	**7**	**5**
1B	**6**	**6**
2A	**16**	**10**
2B	**13**	**12**

The epistratum feeders were more dominant in both the algae followed by predators/omnivores, non-selective deposit feeders and selective deposit feeders. The most common feeding type in *Caulerpa fastigiata* was epistratum feeders (2A) followed by the Predators/ omnivores (2B), non-selective deposit feeders (1B) and deposit feeders (1A). The dominant epistrate feeder observed was *Dorylaimposis punctata* (21.6%) followed by *Pomponema debile* (2.47%), *Chromadora* sp. (2.37%) and *Paracanthonchus longicaudatus* (1.27%).The dominant predators/omnivores (2B) was *Haloncholaimus dolichurus* (11.97%) followed by *Viscosia cobbi* (5.69%) and *Viscosia glabra* (2.90%).

The dominant non-selective deposit feeders (1B) were *Metalinhomoeus longiseta* (8.03%), followed by *Desmolaimus zeelandicus* (3.32%), *Daptonema setifer* (3.27%), *Daptonema invagiferoum* (2.27%) and *Daptonema procerum* (1.85%). The dominant selective deposit feeders (1A) were *Terschellingia communis* (3.14%), followed by *Terschellingia* sp. (1.89%), *Halalaimus longicaudatus* (2.52%) and *Astomonema southwardorum* (1.34%).

The most common epistratum feeder (2A) in *Caulerpa taxifolia* was *Dorylaimposis punctata* (3.54%) followed by *Paracanthonchus caecus* (3.30%), *Paracanthonchus longicaudatus* (3.10%) and *Pomponema tesselatum* (2.78%). The dominant predators/omnivores (2B), were *Haloncholaimus dolichurus* (13.78%) followed by *Viscosia cobbi* (3.89%) and *Viscosia glabra* (1.67%). The dominant non-selective deposit feeders (1B) were *Metalinhomoeus longiseta* (6.69%) followed

by *Daptonema vicinum* (5.17%), *Daptonema invagiferoum* (3.96%), *Theristus acer* (3.17%) and *Daptonema procerum* (2.34%). The dominant selective deposit feeders (1A) were *Halalaimus longicaudatus* (2.90%), followed by *Terschellingia communis* (2.51%), *Astomonema southwardorum* (1.87%) and *Anticoma acuminata* (1.26%).

The above observations reveal that *Dorylaimposis punctata* [epistratum feeder (2A)] was dominant on *Caulerpa fastigiata*, while *Halichoanolaimus dolichurus* [predator/omnivore (2B)] is dominant on *Caulerpa taxifolia*.

DISCUSSION

The phytal nematofauna was different among the *Caulerpa fastigiata* and *Caulerpa taxifolia* and the dominant genera associated to each species were different, suggesting that the substrate structural complexity may influence the assemblage structure. The major trophic groups are epigrowth feeders, suggesting the existence of a benthic food web based on detritus and benthic primary producers. **[13]** pointed out a characteristic phytal genera association: *Anticoma, Thoracostoma, Phanoderma, Enoplus, Oncholaimus, Paracanthonchus, Chromadora* and *Euchromadora* and most of these were found in the present study. Epigrowth feeders/herbivores dominated on *Caulerpa fastigiata* and *Caulerpa taxifolia*. These results are similar to those obtained by **[13, 14, 15, 8]**, who described epistratum feeders dominance on phytal environments. **[13]** pointed out that some trophic groups may be related to the habitat structure and/or environmental condition: bigger individuals, predators, are better able to exploit the macrophytes habitats, which are exposed to wave action, while the smaller individuals, epistrate feeders, usually dominate sheltered areas. **[16]** studying the nematode fauna associated to macroalgae holdfasts in Chile, has found in an exposed beach, a co-dominance between epistratum feeders and predators/omnivores genera.

CONCLUSION

This study provides key information on the biodiversity of phytal associated nematodes from the Indian coast.

ACKNOWLEDGEMENTS

We are thankful to the authorities of the Andhra University for providing necessary facilities to carry out this work. One of us (Jaya, P.) is very grateful to the University Grants Commission, New Delhi, for providing study leave and research fellowship under XI plan Faculty Development Programme, during the tenure of which the present work was undertaken.

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